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(10) REPUBLIC OF FRANCE
NATIONAL INDUSTRIAL PROPERTY INSTITUTE
PARIS

(11) Publication number [?...?] **2 640 497**

(21) National Registration number: **88 17262**

(51) Int. Cl.: A 61 F 2/32

(12) **PATENT APPLICATION** **A1**

(22) **Filing date:** 19 December 1988

(30) **Priority:**

(43) **Date of publication of the application:** BOP "Patents" No. 25 of 22 June 1990

(60) **References to other obvious national documents:**

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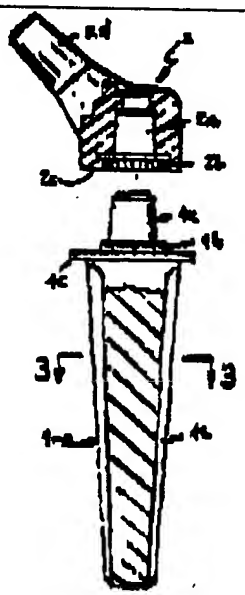
(54) Femoral implant for hip prosthesis

(57) Femoral implant for hip prosthesis of the type of those having a rod in which the proximal end is shaped for the mounting in a removable manner, of a platform suitable to receive directly or in an added way, a femoral head, characterized in that the end of the rod 1 and the platform 2 have complementary layouts suitable to ensure their variable relative angular positioning, the said layouts being shaped to not hamper their passage to the level of the greater trochanter.



FR 2 640 497 –

Femoral implant for hip prosthesis

The invention involves more specifically total hip prostheses, fitted without cement. Particularly the implant is of the type of those having a rod intended to be engaged in the medullary canal of the femur, and whose proximal end is shaped for the mounting and fitting of a platform.

In a known way, the seat receives directly or in an added manner a femoral head.

Essentially a prosthesis must ensure good bone implantation adapted to the different varied morphotypes of anatomy and physiology.

Moreover, the implant must be able to be inserted easily by avoiding significant bone destruction or preoperative fractures.

Generally, implants of the type of those indicated need a significant bone resection of the greater trochanter, which can break.

The invention is fixed for the purpose of overcoming these problems.

To solve the problem raised of avoiding in particular any bone destruction, the end of the rod and the platform have complementary layouts suitable to ensure their variable relative angular positioning, the said layouts being shaped to not hamper their passage to the level of the greater trochanter.

Advantageously, the layouts comprise, for the rod, a polygonal surface formed concentrically at the base of a centering block, for the platform, an indexed recess suitable for mating with the polygonal surface, the said recess being formed concentrically to an internal counterbore suitable for receiving the said centering block.

Another problem that the invention proposes to solve

is to have a complete filling of the diaphyseal shaft and a good stability of the rod by avoiding any swinging phenomenon and any risk of loosening likely to result from significant stresses exerted at a given point.

These problems are corrected in that the indexed recess of the platform is established from a support plate able to mate, after engagement of the said recess on the polygonal part of the rod, with a collar formed in the proximal part of the said rod, at the level of the anterior and posterior cortex of the femoral shaft.

This results, considering the embedded position of the platform with reference to the outside diameter of the collar, in elimination of the risk of having bone fragments likely to intervene during the installation of the said platform.

Another problem that the invention proposes to correct is to have a very good holding in the spongy tissue and in the cortex.

In a first embodiment, one such problem is resolved in that the rod is tapered in shape and has a self-tapping double-pitch thread.

In another embodiment, the rod is tapered in shape and has profiled longitudinal flutes suitable to facilitate bone restoration.

Advantageously, the body of the rod undergoes a surface treatment suitable to improve anchoring and bone restoration.

The invention is laid out below, in more detail, using the attached drawings in which:

- FIG. 1 is a front view of the implant in one example of embodiment, and with mounting of the platform on the rod.

- FIG. 2 is a front view showing the implant installed in the medullary canal of the femur.

- FIG. 3 is a transverse cutaway view along line 3-3 of FIG. 2.

- FIG. 4 is a transverse cutaway view along line 4-4 of [?FIG. 1?].

To render the purpose of the invention more concrete, it is described, in a non-limiting way by referring to the examples of embodiment of the figures of the drawings.

In a known way, the implant comprises a rod (1) and a connected platform (2). The rod (1), at the level of its proximal end, is laid out to receive, the platform (2) in which a part has a lateralized neck (2d) suitable for receiving, directly or in additional fashion, a femoral head (3).

In the embodiment illustrated, the upper part of the rod (1) has a centering post (1a) for the mounting of the platform (2) using an internal counterbore (2a). The post (1a) and the internal counterbore (2a) have complementary profiles, generally tapered.

The centering post (1a) has concentrically to its base, a polygonal surface (1b), on which it can be engaged and centered, with capability for angular orientation, an indexed recess (2b) formed concentrically at the end of the bore (2a) of the platform. In a preferred way, the surface (1b) is octagonal, while the complementary recess (2) has a series of teeth regularly offset angularly around the circumference, by about 15 degrees.

It is thus possible to block the platform (2) in rotation with reference to the rod, in different angular positions, to allow, if necessary, adjustment in the anteversion of the femoral neck. The possibility for this adjustment avoids the risks of luxation if the notching is insufficient.

These layouts (1b-2b) for blocking in rotation of the platform (2) receiving the femoral head with reference to the rod in different angular positions, allow advantageously dimensioning the said platforms so as to respect to the maximum possible the greater trochanter as well as in the bone cut and in the risk of fracture. For this purpose,

the indexed recess (2b) is established from a support plate (2c), suitable to mate, after engagement of the said recess (2b) on the polygonal centering surface (1b), with a collar (1c). This collar is formed in the proximal part of the said rod, at the level of the anterior and posterior cortex of the femoral shaft.

After introduction of the implant into the medullary canal of the femur, the collar (1c) rests on the resected part of the bone, by avoiding, under these conditions, any risk of swinging while improving the stability of the rod (1). This diameter of the collar is limited to not cause bone sacrifice at the level of the greater trochanter, at the time of the installation of the rod.

Moreover, as FIG. 2 shows, after positioning of the platforms (2) on the rod (1), the support plate (2c) of the said platforms is located inside the diameter of the collar, thus eliminating any risk of infiltration of bone fragments into the medullary canal during the installation of the platform (2). The collar (2c) may have notches to fit to a control body with a view to the installation of the rod.

The securing of the platform (2) in reference to the rod (1) may be done by any known and appropriate means. For example, using a screw (4) engaged in the platform in particular in axial alignment with internal bore (2a), by being screwed into a tapped hole, formed in the thickness of the centering post (1a).

As concerns the rod (1) as such, this is prepared to be implanted without cement by being suitable to ensure a very good locking in the spongy tissue and in the cortex.

In the form of embodiment illustrated in FIG. 2, the rod (1) is generally tapered in shape and has a self-tapping double-pitch thread (1d), to improve the speed of installation. In FIG. 1, the rod (1), generally tapered

in shape, has longitudinal flutes (1d), profiled to facilitate bone restoration.

Advantageously, whatever its form of embodiment, the rod (1) undergoes surface treatment to improve anchoring and bone restoration, such as coating with a biological component.

Quite evidently, the rod (1) and the platform (2) are executed in many lengths and diameters based on the anatomy of the patient.

The advantages are quite evident from the description in particular emphasizing:

- Complete filling of the diaphyseal shaft by the rod.
- Elimination of the risk of swinging of the rod.
- Elimination of excessive stresses at a given point likely to cause loosening.
- Minimal bone resection at the level of the greater trochanter.

CLAIMS

-1- Femoral implant for hip prosthesis of the type of those having a rod in which the proximal end is shaped for the mounting in a removable manner, of a platform suitable to receive directly or in an added way, a femoral head, characterized in that the end of the rod (1) and the platform (2) have complementary layouts suitable to ensure their variable relative angular positioning, the said layouts being shaped to not hamper their passage to the level of the greater trochanter.

-2- Implant according to claim 1, characterized in that the layouts are constituted, as far as the rod (1) is concerned, by a polygonal surface (1) formed concentrically at the base of a centering post (1a) and, as far as the platform (2) is concerned, by an indexed recess (2b) suitable to mate with the polygonal surface (1a), the said recess (2b) being formed concentrically to an internal counterbore (2a) suitable to receive the said centering post (1a).

-3- Implant according to claim 2, characterized in that the indexed recess (2b) of the platform (2) is established from a support plate (2c) suitable for mating, after engagement of the said recess on the polygonal surface of the rod, with a collar (1c) formed in the proximal part of the said rod, at the level of the anterior and posterior cortex of the femoral diaphyseal.

-4- Implant according to claim 3, characterized in that the collar (1c) has notches to fit into a control member with a view to the installation of the rod in the medullary canal of the femur.

-5- Implant according to claim 1, characterized in that

the rod (1) is tapered and has a self-threading double-pitch thread.

-6- Implant according to claim 1, characterized in that the rod (1) is tapered and has profiled longitudinal grooves suitable to facilitate bone restoration.

-7- Implant according to either of claims 5 and 6 characterized in that the body of the rod undergoes a surface treatment to improve anchorage and bone restoration.

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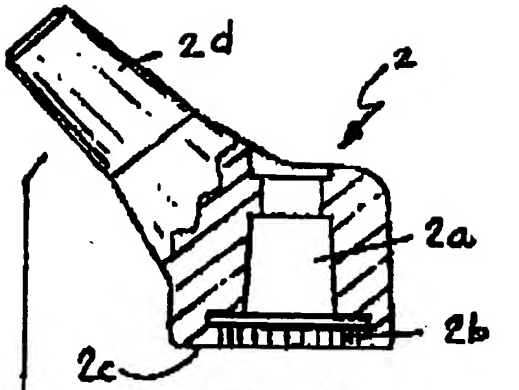


FIG.1

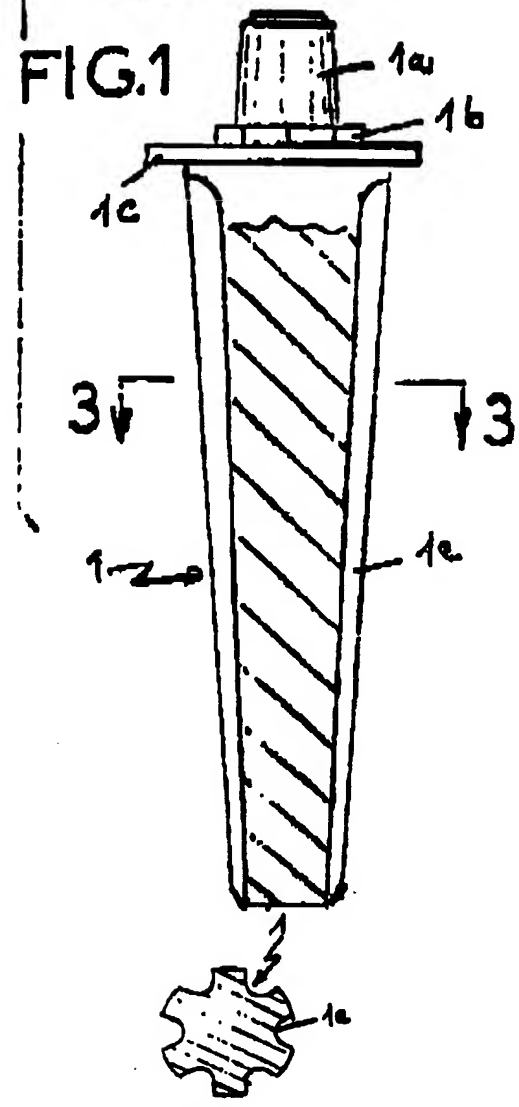
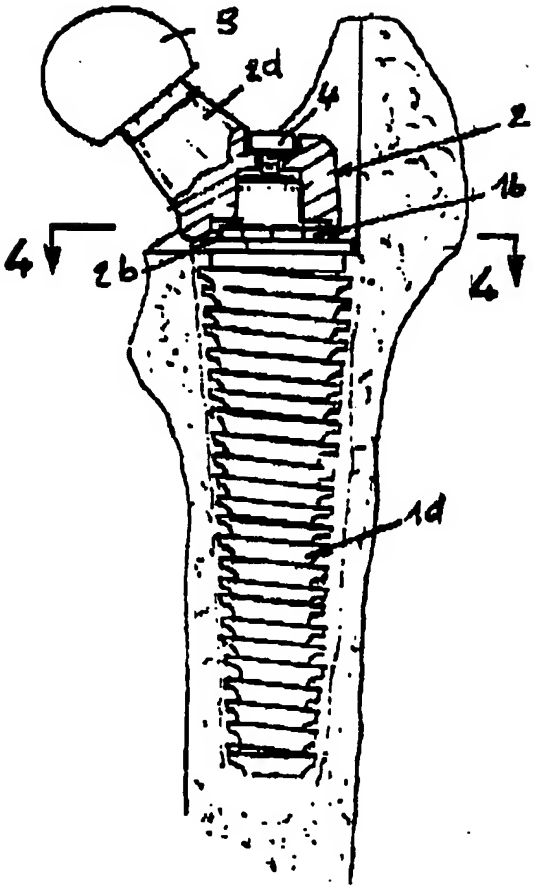


FIG. 3

FIG.2



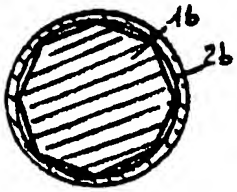


FIG.4